

WHAT IS CLAIMED IS:

1. A process for separating a valuable product from a raw material comprising:
providing a raw material comprising one or more unsaponifiable compounds and one or more saponifiable compounds, wherein the one or more saponifiable compounds comprises one or more compounds in free acid and/or soap form;
reacting the saponifiable component comprising one or more compounds in free acid and/or soap form with a metal soap-forming compound to make a first product comprising metal soaps and one or more unsaponifiable compounds; and
subjecting a mixture of metal soaps and one or more unsaponifiable compounds to a distillation to form a distillate comprising at least a portion of the unsaponifiable compounds and a residue comprising the metal soaps.
2. A process according to Claim 1, wherein the raw material is selected from the group consisting of black liquor skimming soap, tall oil soap, crude tall oil, tall oil pitch, sugarcane oil, residues from extraction, degumming, and refining of oils and fats, distillation residues of fatty acids and esters of animal and/or vegetable origin, deodorization distillates of vegetable oils, soybean oil, rice bran oil, shark liver oil, beef tallow, coffee oil, fish oil, cod liver oil, wheat germ oil, corn germ oil, palm oils, andiroba oils, and oil from tomato residues.
3. A process according to Claim 1, wherein the metal soap-forming compound is selected from the group consisting of oxides, sulfates, hydroxides, carbonates, acetates and chlorides of zinc, iron, manganese, magnesium, calcium, copper, cobalt, lead and aluminum.
4. A process according to Claim 1, wherein the valuable product is selected from the group consisting of provitamins, growth factors, flavonoids, sterols, lipoproteins, stilbenes, vitamins, fatty and wax alcohols, diterpenes, steroids, triterpenes, stilbenes, fatty acids, and rosin acids.
5. A process according to Claim 1, wherein the valuable product is selected from the group consisting of tocopherols, tocotrienols, carotenoids, vitamin A, vitamin K, vitamin D, squalane, oryzanol, lycopene, ceryl alcohol, cetyl alcohol, lignoceryl alcohol, behenyl alcohol, resin alcohols, resin aldehydes, labdanes, sitosterol, stigmastanol, campesterol, campestanol, cholesterol, cycloartenol, 3,5-stigmastadien-7-one, serratenediol, squalene, prenols, trans-pinosylvin dimethyl ether, abietic acid, dehydroabietic acid, neoabietic acid,

isopimaric acid, pimaric acid, paulstric acid, oleic acid, linoleic acid, stearic acid, and palmitic acid.

6. A process according to Claim ~~1~~, further comprising reacting the raw material with a sodium or potassium base to saponify free acid saponifiable compounds thereby forming a mixture comprising saponified compounds and unsaponifiable compounds prior to the reacting to make the first product.

7. A process according to Claim ~~6~~, wherein the sodium or potassium base is selected from the group consisting of sodium hydroxide and potassium hydroxide.

8. A process according to Claim ~~6~~, further comprising hydrolyzing esters in the raw material upon exposure to the sodium or potassium base.

9. A process according to Claim ~~6~~, further comprising adding a mineral acid to at least a portion of the saponified compounds to form an acidulated mixture prior to the reacting to make the first product.

10. A process according to Claim ~~9~~, further comprising subjecting the acidulated mixture to a distillation to produce a residue comprising one or more non-volatile compounds and a distillate comprising one or more unsaponifiable compounds and one or more saponifiable compounds prior to the reacting to make the first product.

11. A process according to Claim ~~1~~, further comprising subjecting the raw material to a distillation to produce a residue comprising one or more non-volatile compounds and a distillate comprising one or more unsaponifiable compounds and one or more saponifiable compounds prior to the reacting to make the first product.

12. A process according to Claim ~~1~~, further comprising hydrolyzing esters in the raw material to make a raw material including hydrolyzed esters prior to the reacting to make the first product.

13. A process according to Claim ~~12~~, wherein the hydrolysis is performed by combining the raw material with water under high pressure and high temperature.

14. A process according to Claim ~~12~~, further comprising subjecting the raw material including hydrolyzed esters to a distillation to produce a residue comprising one or more non-volatile compounds and a distillate comprising one or more unsaponifiable compounds and one or more saponifiable compounds prior to the reacting to make the first product.

15. A process according to Claim 1, further comprising treating the raw material to remove impurities and/or non-volatile compounds prior to the reacting to make the first product.

16. A process according to Claim 1, wherein the first product is substantially dry.

17. A process according to Claim 1, further comprising treating the first product to remove water prior to the distilling to separate at least a portion of the unsaponifiable compounds from the metal soaps.

18. A process according to Claim 17, wherein the removal of water is effected by thin-film evaporation, decantation and/or centrifugation.

19. A process according to Claim 1, further comprising distilling or evaporating one or more compounds selected from the group consisting of lights, medium-lights, and water from the first product prior to the distilling to separate at least a portion of the unsaponifiable compounds from the metal soaps.

20. A process according to Claim 1, further comprising subjecting the distillate comprising at least a portion of the unsaponifiable compounds to a subsequent distillation to form a second distillate and a second residue, thereby further purifying and/or separating the unsaponifiable compounds.

21. A process according to Claim 20, further comprising crystallizing sterols in the second residue.

22. A process according to Claim 1, further comprising acidulating the residue comprising the metal soaps to form their corresponding free acids.

23. A process according to Claim 22, further comprising distilling the free acids.

24. A process for obtaining purified tall oil, comprising:

providing crude tall oil comprising one or more unsaponifiable compounds and two or more saponifiable compounds, wherein the saponifiable compounds comprises fatty acids and rosin acids in free acid and/or soap form;

reacting the saponifiable compounds with a metal soap-forming compound to make a first product comprising metal soaps and one or more unsaponifiable compounds; and

distilling or evaporating one or more compounds selected from the group consisting of lights, medium-lights, water, and unsaponifiable compounds from the first product;

distilling a mixture of metal soaps and one or more unsaponifiable compounds to form a distillate comprising at least a portion of the unsaponifiable compounds and a residue comprising the metal soaps; and

acidifying the residue to form a mixture comprising the rosin acids and fatty acids substantially in free acid form.

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